



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,244	12/07/2004	Hiroyuki Morioka	112857-402	3110
29175	7590	01/08/2008	EXAMINER	
BELL, BOYD & LLOYD, LLP			WARTALOWICZ, PAUL A	
P. O. BOX 1135			ART UNIT	PAPER NUMBER
CHICAGO, IL 60690			1793	
MAIL DATE		DELIVERY MODE		
01/08/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/517,244	MORIOKA ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Paul A. Wartalowicz	1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 27 October 2007.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 27-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 27-32 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Response to Arguments***

Applicant's arguments filed 3/27/07 have been fully considered but they are not persuasive.

Applicant argues that the claimed limitation wherein the hydrogen occluding material is capable of releasing hydrogen gas in the absence of chemical and mechanical treatment has support in at least example 3.

However, regarding the absence of chemical treatment, it is unclear what this is referring to. The absence of chemical treatment is a broad limitation and does not appear to have support in example 3. The addition of a catalyst such as titanium tetrachloride, as in example 3, appears to be an example of chemical treatment. Additionally, this does not appear to meet the requirement of an inert environment.

Additionally, regarding the absence of mechanical treatment, applicant has also indicated support in example 3. However, this broad limitation of the absence of mechanical support does not appear to have support in example 3. Mixing the two components in an agate mortar carried out the doping of the aluminum hydride with titanium tetrachloride is a mechanical treatment of the aluminum hydride. Therefore, example 3 does not lend support to these limitations.

It is further pointed out that applicant has not illustrated support for the claim amendments entered 9/22/06.

Applicant argues that the aluminum hydride of the invention provides a greater amount of hydrogen gas in one stage at a lower temperature as compared to an alanate.

However, the specific examples are not limiting. Pecharsky et al. teaches a solid hydride of formula  $\text{AlH}_3$  (Column 4, lines 11-28, line 24 in particular) and that the hydride releases hydrogen at a temperature in the range from  $-200^\circ\text{C}$  to about  $100^\circ\text{C}$  (Column 4, line 65 through Column 5, line 5). From this disclosure, Pecharsky et al. teaches aluminum hydride as a solid hydride suitable for the invention of Pecharsky et al. As to the arguments drawn to the differences between alanates and aluminum hydrides, the materials of Pecharsky et al. appear to be the same as those instantly claimed and therefore would inherently exhibit the same hydrogen capacity.

Applicant argues that Pecharsky is directed to a hydride-based solid material that is mechanically processed in the presence of a catalyst to obtain pure gaseous hydrogen and that the claimed invention requires release of hydrogen in the absence of chemical and mechanical treatment.

However, Pecharsky discloses processing of the aluminum hydride in the absence of chemical treatment (col. 4). As to the limitation of the absence of mechanical treatment, it appears that Pecharsky teaches a substantially similar mechanical treatment as that of the currently claimed invention. While Pecharsky teaches the use of a ball mill, the current invention teaches the use of an agate mortar, the use of either of these apparatus constitute mechanical treatment.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 27 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

It is requested that applicant point out the recitation in the specification that provides support for the amendments to claims 27 and 28 filed 9/22/06.

Further, the limitation "absence of mechanical treatment in an inert atmosphere" does not appear to have support in the specification. Applicant has pointed to example 3 as some evidence of support, however example 3 does not render support for these limitations as explained above.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 27-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Pecharsky et al. (6773692).

Pecharsky et al. disclose the instantly claimed hydrogen occluding material and the method of using the hydrogen occluding material. Pecharsky et al. teaches a solid hydride of formula  $\text{AlH}_3$  (Column 4, lines 11-28, line 24 in particular) and that the hydride releases hydrogen at temperature in the range from  $-200^\circ\text{C}$  to about  $100^\circ\text{C}$  (Column 4, line 65 through Column 5, line 5) in an inert atmosphere (col. 5). Pecharsky et al. also teaches the use of a catalyst in combination with the hydride, the catalyst selected from metals belonging to periods III to V of the periodic table (Column 4, lines 42-52), that the catalyst and hydride are powders (Column 5, line 6), and also that the catalyst is present in an amount of about 0.1-25 mol%, about 1-15 mol%, or even about 1.5-10 mol% (Column 4, lines 53-64). Pecharsky et al. even specifically teaches in examples the use of lithium in addition to Ti (Example 1-2 and 4) and Fe (Example 3) as the catalyst dopant. No difference is seen between the instantly claimed invention and Pecharsky et al.

As to the claim limitations wherein the hydrogen release occurs in one step, the materials of Pecharsky et al. appear to be the same as those that are claimed and therefore would inherently exhibit the same hydrogen capacity.

As to the limitation of the absence of mechanical treatment, it appears that Pecharsky teaches a substantially similar mechanical treatment as that of the currently claimed invention. While Pecharsky teaches the use of a ball mill, the current invention

teaches the use of an agate mortar, the use of either of these apparatus constitute mechanical treatment.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 29-32 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pecharsky et al. (6773692).

Pecharsky et al. disclose the instantly claimed hydrogen occluding material and the method of using the hydrogen occluding material as described with respect to claims 27 and 28 above.

If the teachings of Pecharsky et al. as described above do not anticipate the instantly claimed limitations, they would be obvious because Pecharsky et al.

specifically teaches that the catalyst to be included in the material is a transition metal, and specifically comprises "a transition metal of the 3<sup>rd</sup> (Sc through Zn), the 4<sup>th</sup> (Y through Cd), or the 5<sup>th</sup> (Hf through Hg) period of the periodic table, or lanthanide elements (La through Lu), or their derivatives, or mixtures thereof" and that titanium is preferred in Column 4, lines 42-52. This teaching includes not only groups III-V of the periodic table but also includes Cr, Fe, and Ni; thus Pecharsky et al. teach that mixtures of this may be used. Furthermore, Examples 1-2 and 4 teach an aluminum hydride that contains both lithium (an alkali metal) and titanium (a transition metal of groups III-V).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Paul Wartalowicz  
December 31, 2007

/Steven Bos/  
Steven Bos  
Primary Examiner  
A.U. 1793